The ADBNet assessment summary for Cedar River (IA 02-CED-456) accurately summarizes the external data shared by Iowa DNR (2022IowaExternalData.xlsx; NitrateSummaryData.20220902). Iowa DNR does not collect ambient data for this segment because of USGS and Cedar Rapids facility monitoring.

Assessment Explanation

Data Sources:

Data Source	Data Source ID	Data Type	Data Age	Site ID	Site Name	Site Description
CRWW	14	WQ	CY 2018-2020	99990021	Cedar River	
USGS	11	WQ	CY 2018-2020	5464420	Cedar River at Blairs Ferry Road at Palo, IA	
Iowa DNR	6	BIO	See Below	1260	Cedar River	Cedar Rapids – REMAP #410

Class C - Conventional Parameters:

Site ID	Data Source ID	Parameter Name	# Samples / # Years	Minimum Value	Maximum Value	Mean Value	Median Value	# Violations	Violates Significantly >10% Rule?	Assessment Type	Support Level
5464420	11	Chloride	13 / 3	9.2	26.2	18.6	18.4	0	NO	Monitored	Full
99990021	14	Chloride	147 / 3	2.5	62	22.3	20.9	0	NO	Monitored	Full
5464420	11	Fluoride	13 / 3	150	220	191	190	0	NO	Monitored	Full
5464420	11	Nitrate + Nitrite	33 / 3	1.46	9.73	5.14	5.15	0	NO	Monitored	Full
99990021	14	Nitrate	149 / 3	0.05	10.6	5.3	5.7	1	NO	Monitored	Full
99990021	14	Nitrite	148 / 3	0.005	0.09	0.01	0.005	0	NO	Monitored	Full
5464420	11	pH	34 / 3	7.4	8.8	8.1	8.1	0	NO	Monitored	Full
99990021	14	pH	153 / 3	7.1	9.2	8.2	8.1	2	NO	Monitored	Full

Cedar Rapids

In order to evaluate 2020 to 2022 data for the 2024 IR cycle, we would need to contact Cedar Rapids to access their data or wait until the state collects and submits the data as part of their submission.

USGS

USGS data is available online. It appears Iowa DNR uses parameter 00631 for their assessment of data from this station.

- 00618 – Parameter for nitrate, mg/L as N, dissolved; EPA equivalence agrees with this parameter description
- 00613 – Parameter for nitrite, mg/L as N, dissolved; EPA equivalence agrees with this parameter description
- 00631 – Parameter for nitrate plus nitrite, mg/L as N, dissolved inorganic nitrogen; EPA equivalence agrees with this parameter description
- 99133 – Parameter for nitrate + nitrite, mg/L as N, inorganic N; continuous data; EPA equivalence not checked
    - Ask about how equivalences are looked at/who does that → Messaged Mandy
    - Equivalences are not relevant here. See email from Daniel Button (dtbutton@usgs.gov) on 11/2/2022 (Email.USGS-EPAEquivalences.20221102.pdf).

Currently (1/27/2023), USGS sample data is available through July 2022 for parameter 00631 (DiscreteandContinuous.20230130.xlsx).

(b) (5) [redacted]

USGS continuous data for parameter 99133 is available, and the record has been worked through 11/28/2022. Publicly available data is represented as a daily mean (USGS_05464420.continuous.20221101), but 15-minute interval data requested from USGS is also available (NO3+NO2,water,insitu_as_N.mg_l@05464420.EntireRecord.csv).

(b) (5) [redacted]

(b) (5)

[redacted]

Example from [Effects of Wastewater Effluent Discharge and Treatment Facility Upgrades on Environmental and Biological Conditions of Indian Creek, Johnson County, Kansas, June 2004 through June 2013]

In a USGS study, [Graham et al. (2014)] determined the Hach Nitratax sensor overestimated field measurements by 7% compared to laboratory-measured concentrations.

(exceeded 25 percent of the time).

Ordinary least squares analysis (Helsel and Hirsch, 2002) was used to develop regression models between sensor- and laboratory-measured nitrate concentrations for all sites using all available data. In general, the nitrate sensor tended to overestimate nitrate concentrations by about 7 percent relative to laboratory-measured concentrations, but there were strong linear relations [all adjusted coefficient of determination (R^2) greater than or equal to 0.95] between sensor- and laboratory-measured nitrate at all sites (fig. 2, appendix 1).

sites are available for the period of record on the USGS Web site at *http://nrtwq.usgs.gov/ks/*.

Annual mean nutrient concentrations and loads from the Middle Basin and Tomahawk Creek WWTFs were calculated from weekly water-quality and wastewater effluent discharge volume data provided by Johnson County Wastewater for 2004 through 2013. There were occasional peak wet-weather flow events at the WWTFs during the study period. These peak flow events were not included in load calculations from the WWTFs because data on nutrient concentrations were

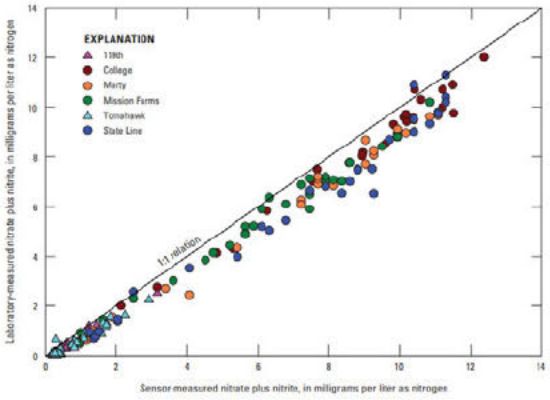

Figure 2. Comparison between sensor-measured and laboratory-measured nitrate plus nitrite concentrations at the Indian Creek study sites.

Example from [Use of real-time sensors for compliance monitoring of nitrate in finished drinking water]

In a study for drinking water, [Jones et al. (2020)] determined that the absolute error for 771 samples measured using a Hach Nitratax sensor was 5.6%.

(b) (5)

[redacted]

(b) (5)

[redacted]

(b) (5)

Methodology

Iowa DNR methodology does not have a protocol to consider continuous monitoring data for nitrate. The examples below are for dissolved oxygen continuous monitoring.

"**Data from results of continuous monitoring for dissolved oxygen:**
DNR staff have long used results of monitoring of dissolved oxygen (DO) generated through analysis of grab samples to assess support of aquatic life uses. Historically, if significantly more than 10% (the 10% rule) of the DO values generated through routine ambient monitoring violated the applicable state water quality criteria, the aquatic life uses would be assessed as "impaired." The data generated through continuous (24-hour) monitoring for DO, however, are not directly applicable to this method of identifying impairments of aquatic life uses. Thus, a separate methodology was developed by DNR staff for the 2014 IR cycle that is designed to identify impairments of aquatic life uses due to low levels of DO (see Attachment 6)."

"Data quantity
In order to use results of continuous DO monitoring for purposes of identifying Section 303(d) impairments, monitoring needs to have been conducted over at least one four-week (28-day) period during mid to late summer (e.g., July and August) in each of two different years within the five-year data collection period (see Table 1). For any 28-day monitoring period, a minimum data interval of two consecutive weeks (14 days) is needed to adequately assess DO levels during critical (late summer) periods. DNR staff will evaluate stream flow levels, air temperatures, and/or precipitation patterns
that existed during deployment in order to determine whether monitoring equipment was deployed during the target conditions."

"Identifying violations of Iowa's DO criteria using continuous data for DO
A violation of Iowa's DO criteria based on continuous monitoring data will be identified if results of continuous monitoring show that either of the following conditions has occurred:

- Levels of DO fail to meet the 16-hour criterion for more than 8 hours of a 24-hour period. In the context of continuous monitoring for DO, a violation would be a day where levels of DO failed to remain above the 16-hour criterion for at least 16 hours.
- Levels of DO fail to meet the 24-hour criterion. In the context of continuous monitoring for DO, a violation of this criterion would be a day (24-hour period) when the DO falls below the 24-hour criterion."

"Identifying impairments of aquatic life uses based on continuous monitoring data for DO
Based on a 28-day deployment of continuous DO monitoring equipment, a Section 303(d) impairment of designated aquatic life uses will be identified if any of the following conditions occurs during each of two 28-day monitoring periods during different years within a five-year period:

- Significantly greater than 10% (the 10% rule) of the days monitored have levels of DO that fail to meet the 16-hour criterion for more than 8 hours of the 24-hour period.
    - Impairment based on this provision in the absence of impairment due to violations of the 24-hour criterion would suggest potential chronic impacts to the aquatic community.
- Significantly greater than 10% of the days monitored have levels of DO that fail to meet the 24-hour minimum DO criterion.
    - Impairments based on this provision would suggest relatively short-term and more severe impacts to the aquatic community from low DO."

USGS Resources

National Field Manual

Iowa Water Science Center Gage Network

Continuous Nutrient Monitoring Networks

Nitrate in Environmental Waters

EPA Resources

Chemical Contaminant Rules

Technical Support Document for Water Quality-based Toxics Control

Language for Scope Recommendation

CWA 303(d)

'(d)(1)(A) Each State shall identify those waters within its boundaries for which the effluent limitations required by section 301(b)(1)(A) and section 301(b)(1)(B) are not stringent enough to implement any water quality standard applicable to such waters.'

'Such load shall be established at a level necessary to implement the applicable water quality standards with seasonal variations and a margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality.'

40 CFR 130.7

(b)(5)(ii) 'Waters for which dilution calculations or predictive models indicate nonattainment of applicable water quality standards;'

(b)(5)(iii) 'Waters for which water quality problems have been reported by local, state, or federal agencies; members of the public; or academic institutions.'

(b)(5)(iv) 'Waters identified by the State as impaired or threatened in a nonpoint assessment submitted to EPA under section 319 of the CWA or in any updates of the assessment.'

(c)(1)(ii) "TMDLs shall be established for all pollutants preventing or expected to prevent attainment of water quality standards as identified pursuant to paragraph (b)(1) of this section."